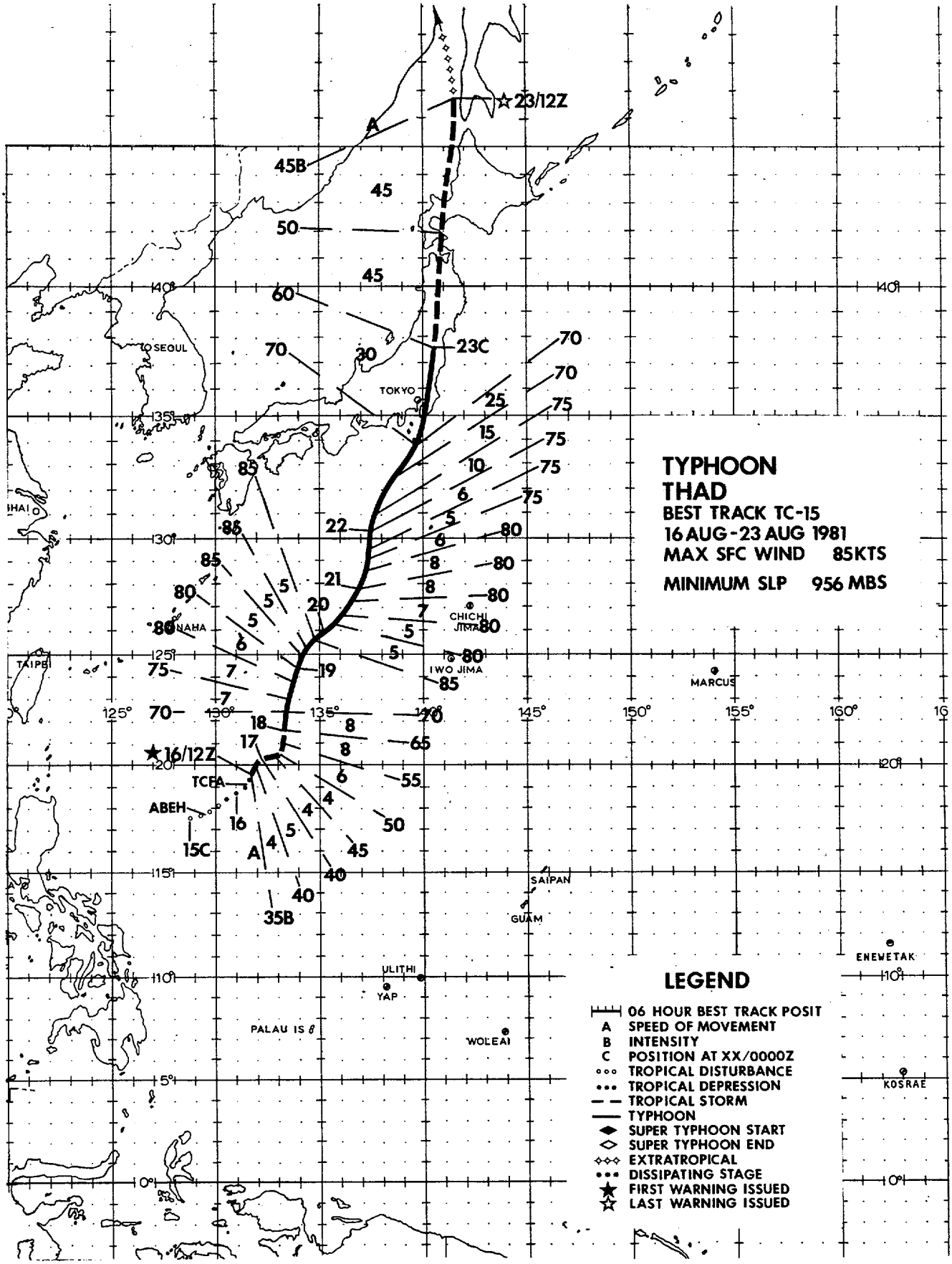
TYPHOON
THAD
BEST TRACK TC-15
16 AUG - 23 AUG 1981
MAX SFC WIND 85KTS
MINIMUM SLP 956 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
☆23/12Z
★16/12Z
23C
15C
35B
45B
TO SEOUL
TOKYO
CHICHI JIMA
IWO JIMA
NAHA
TAIPEI
MARCUS
SAIPAN
GUAM
ENEWETAK
ULITHI
YAP
WOLEAI
KOSRAE
PALAU IS
TCEA
ABEH

The monsoon trough was particularly active in mid-August, and within the 48 hour period beginning 16 August three tropical cyclones were spawned. Typhoon Thad, the first of the three, was initially evident on 10 August when surface synoptic data indicated a weak circulation was embedded in the trough near 18N 130E. The circulation was first cited in the Significant Tropical Weather Advisory on 15 August when satellite imagery indicated limited outflow had developed above the surface circulation. The outflow was initially the result of a 200 mb ridge that had built westward over the surface trough. Continued improvement in the outflow prompted the issuance of a Tropical Cyclone Formation Alert at 151800Z. Aircraft reconnaissance data, which located the circulation near 19N 132E, provided the basis for the alert area being moved northeast and reissued at 160530Z. Analysis of 160000Z 200 mb synoptic data showed that an anticyclone had developed in the ridge over the circulation, enhancing the outflow pattern necessary for further intensification of the disturbance.

Satellite imagery eventually indicated better organization of the system, thus the first warning on TD-15 was issued at 161200Z. TD-15 was initially forecast to move slowly northward then accelerate to the northwest as it came under the influence of easterly winds south of the 500 mb ridge. By 170600Z both aircraft and satellite data showed Thad's movement was to the northeast in response to a weakness in a 500 mb ridge which had developed over Japan (Fig. 3-15-1). Forecasts of this 500 mb feature maintained the weakness over Japan and the forecast track for Thad was adjusted from northwestward to northward to reflect the new steering pattern. Recurvature was expected east of Japan.

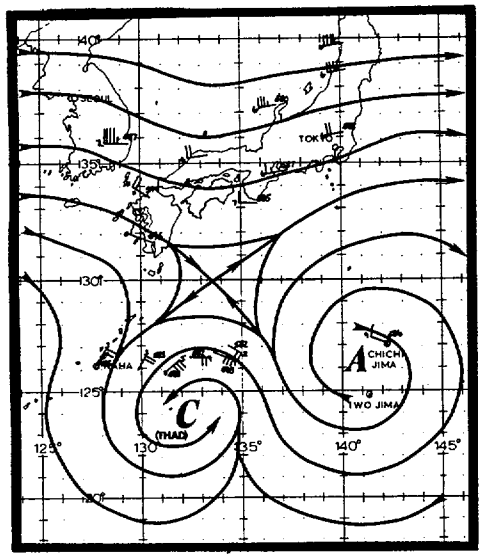

Figure 3-15-1. 500 mb streamline analysis for 181200Z showing the major synoptic features upon which the recurvature forecast was based. Wind data are a combination of rawinsonde and aircraft reconnaissance data. Wind speeds are in knots.

By 180000Z Thad had reached typhoon strength and developed a ragged eye that remained for 80 hours (Fig. 3-15-2).

As Thad neared 30N, analysis of 500 mb data established the likelihood that Thad would interact with a progressing long wave trough just south of Japan, where recurvature and subsequent acceleration were expected. Post-analysis has revealed several deficiencies in that conclusion: the trough did move eastward over the Sea of Japan late on 21 July; a rapidly building ridge east of Thad caused the trough to stall northwest of Thad; coincident with the stalling long wave, a weak short wave moved through the trough and caused a rapid, unforecast, deepening. The entire trough system generated 500 mb height drops of up to 100 meters in 12 hours. This rapid deepening, combined with high pressure in the ridge to the east, established an intense 500 mb pressure gradient over eastern Japan with resultant wind speeds as high as 65 kt (120 km/hr). Thad tracked northward under the influence of the 500 mb flow, was entrained into this area of high winds early on 22 August and accelerated very rapidly to the north over eastern Japan, rather than taking the expected recurvature path. Thad's speed of advance accelerated from 10 kt (19 km/hr) at 220000Z to 45 kt (83 km/hr) by 230000Z.

Post analysis has shown Thad started a very rapid extratropical transition near 32N that continued as the system accelerated along the eastern side of the trough. The rapid acceleration, and an associated rapid entrainment of cool dry air, completed the transition by 231200Z, at which time satellite imagery indicated Thad had merged with the trough over the Tatar Strait and was no longer discernible as a tropical entity.

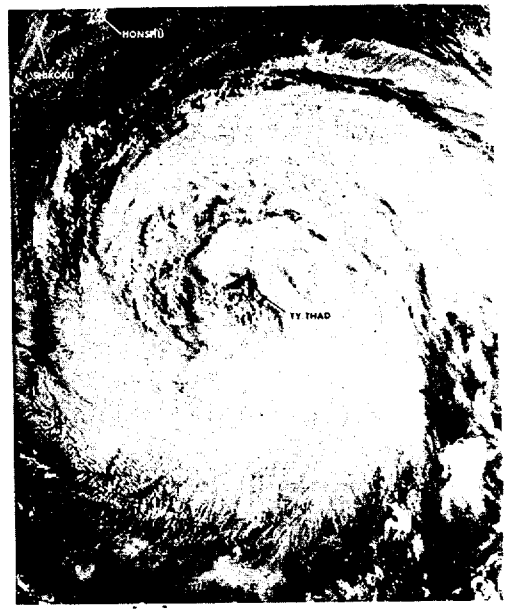

Figure 3-15-2. Visual satellite imagery from 202259Z Aug 81 showing Thad at 80 knots (41 m/sec) intensity, with ragged eye. (NOAA 6 visual imagery)